

WHAT IS CLAIMED IS:

1. A semiconductor device comprising:

a substrate;

a first Group III nitride semiconductor layer formed on the substrate;

5 a first oxide layer formed in proximity to upper portions of defects present in the first Group III nitride semiconductor layer; and

a second Group III nitride semiconductor layer including a positive layer and formed over each of the first Group III nitride semiconductor layer and the first oxide layer.

2. The semiconductor device of claim 1, wherein the first oxide layer is obtained

10 by oxidizing, in an oxygen compound atmosphere, a portion of the first Group III nitride semiconductor layer which is present in proximity to the upper portions of the defects.

3. The semiconductor device of claim 2, wherein the oxygen compound is water vapor.

4. The semiconductor device of claim 1, wherein

15 the first Group III nitride semiconductor layer and the first oxide layer include a plurality of the first Group III nitride semiconductor layers and a plurality of the first oxide layers, respectively, which are formed in alternately stacked relation under the second Group III nitride semiconductor layer and

20 a density of defects present in each of the plurality of the first Group III nitride semiconductor layers decreases gradually with an increase in distance of a position of each of the defects present therein from the substrate.

5. The semiconductor device of claim 1, further comprising:

a second oxide layer obtained by oxidizing the second Group III nitride semiconductor layer in a water vapor atmosphere and located in proximity to the positive

25 layer.

6. The semiconductor device of claim 5, wherein the second oxide layer is a current block layer formed to cover a circumference of the positive layer and thereby confine a current flowing in the positive layer.

7. The semiconductor device of claim 5, wherein the second oxide layer is a gate
5 oxide film of a field effect transistor formed on the positive layer.

8. The semiconductor device of claim 1, wherein the substrate is made of sapphire, spinel, GaAs, Si, SiC, or GaN.

9. A semiconductor device comprising:

a first Group III nitride semiconductor layer serving as a substrate;

10 a first oxide layer formed in proximity to upper portions of defects present in the first Group III nitride semiconductor layer; and

a second Group III nitride semiconductor layer including a positive layer and formed over each of the first Group III nitride semiconductor layer and the first oxide layer.

10. The semiconductor device of claim 9, wherein the first oxide layer is obtained
15 by oxidizing, in an oxygen compound atmosphere, a portion of the first Group III nitride semiconductor layer present in proximity to the upper portions of the defects.

11. The semiconductor device of claim 10, wherein the oxide compound is water vapor.

12. The semiconductor device of claim 1, 2, 9, or 10, wherein the positive layer is
20 an active layer composing a semiconductor laser device or a channel layer of a field effect transistor.

13. A semiconductor device comprising:

a Group III nitride semiconductor layer including a positive layer; and

an oxide layer formed in proximity to upper portions of defects present in the

25 Group III nitride semiconductor layer.

14. The semiconductor device of claim 13, wherein the positive layer is an active layer composing a semiconductor laser device or a channel layer of a field effect transistor.

15. A method for fabricating a semiconductor device, the method comprising the steps of:

5 forming a first Group III nitride semiconductor layer; and

forming a first oxide layer in proximity to upper portions of defects present in the first Group III nitride semiconductor layer.

16. The method of claim 15, further comprising, after the step of forming the first oxide layer, the step of:

10 forming a second Group III nitride semiconductor layer including a positive layer over each of the first Group III nitride semiconductor layer and the first oxide layer.

17. The method of claim 15, wherein the step of forming the first oxide layer includes the step of:

15 oxidizing, in an oxygen compound atmosphere, a portion of the first Group III nitride semiconductor layer which is present in proximity to the upper portions of the defects.

18. The method of claim 17, wherein the oxygen compound is water vapor.

19. The method of claim 15, wherein the first oxide layer is formed to have a film thickness which is larger at a position closer to each of the defects and decreases with 20 distance from the defect.

20. The method of claim 15 or 16, wherein the step of forming the first Group III nitride semiconductor layer and the step of forming the first oxide layer are alternately repeated.

21. The method of claim 16, further comprising, after the step of forming the 25 second Group III nitride semiconductor layer, the step of:

forming a second oxide layer by oxidizing the second Group III nitride semiconductor layer in proximity to the positive layer in the second Group III nitride semiconductor layer.

22. The method of claim 21, wherein the second oxide layer is formed in stripes.

5 23. The method of claim 16, further comprising, between the step of forming the first oxide layer and the step of forming the second Group III nitride semiconductor layer, the step of:

partly removing the first oxide layer by a heat treatment performed in an atmosphere containing an active gas and thereby exposing an upper surface of the first

10 Group III nitride semiconductor layer.

24. The method of claim 23, wherein the active gas is ammonia.

25. The method of claim 16, further comprising, after the step of forming the second Group III nitride semiconductor layer, the step of:

removing the first Group III nitride semiconductor layer.